Some Distributional Records of Malayan Ferns and Fern Allies

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Athyrium angustisquamatum Holttum, G. B. 11: 273. 1947.

Known hitherto from one collection in Selangor. Found by me at Fraser's Hill, Pahang in January 1952 at approximately 3,900 feet (1727). Here, as before, only one plant was found and although the adjacent area was searched, no others were seen. The plant was well away from streams on the floor of very tall primitive forest where undergrowth was sparse.

A. Boryanum (Willd.) Tawaga, Acta Phytotax, 4. 1935. (*Ctenitis boryana* (Willd.) Copeland, Genera Filicum, 123. 1947).

Collected once before in South Perak in 1881 at an altitude between 1,000 and 1,500 feet. I found this species at Fraser's Hill, Pahang, on a northern slope of the north ridge, in April 1952 at 4,000 feet (1972).

Four plants were seen, one being only a few inches in height. They were growing on the steep forest floor amongst rocks just above a stream, in a dark wet place. Growing with them was *A. accedens* (Bl.) Milde, and *Coniogramme fraxinea* (Don) Diels. The largest frond measured had stipes 61 cm. long with lamina 90 cm. long. The sub-erect rootstock was stout and fleshy, showing distinct marks of old fallen stipe bases. The large lax fronds, olive-green in colour and the transparent septate hairs on the lamina make this a distinctive fern in the field.

A. japonicum (Thunb.) Copeland, Phil. Journ. Sc. Bot. 3: 290. 1908.

This has, I believe, been found recently at Maxwell's Hill in Perak (Sinclair, no. S.F. 38794, Singapore Herbarium, under *A. petersenii* [Kze.] Copel.). At Fraser's Hill in January 1952, I found a small patch of this fern with not more than ten fronds, growing in the earth above a rock drain. Three months later I found it had increased greatly and also found other plants in the vicinity. These were on mossy rocks and on pathsides, in small clearings in the forest, but never far from running water, just below the 4,000 feet contour. (1713).

I have referred this fern to *A. japonicum* for I can see no difference between that species and the plant under discussion. On Maxwell's Hill I have found that it is extremely variable in size and shape; those growing by streams having a lamina commonly 22 cm. long and 10 cm. wide, whilst large clumps growing on banks in short grass have uniformly small fronds. The largest lamina of these measured 13 cm. long and 5 cm. wide, but are usually smaller.

Brainea insignis (Hooker) J. Sm., Cat. Kew Ferns, 5. 1856.

One plant was found by me at 5,800 feet on the summit of Gunong Terbakar in the Cameron Highlands District of Pahang, in February 1948 (1006). It was in a dry place near *Matonia pectinata* R. Br., and had just escaped a fire which had swept over the small summit. It was a stout plant with a trunk of circa 100 cm. in height and diameter of c. 70 cm., yet was not fertile. I have seen this fern in Northern Siam, on Doi Suthep, a mountain near Chiengmai, at approximately 4,500 feet, on a ridge in dry soil. Here it was not uncommon under light shade of medium-sized trees, but where the undergrowth was sparse. Fertile fronds were quite common, and in appearance it resembled a small stout tree-fern. It has previously been found in Malaya on the east coast of Johore and on an island off the west coast of Perak, but not inland.

Christiopteris Copeland, Perkins Fragmenta, 188. 1905.

A new generic record for Malaya. According to Copeland, p. 178[4], there are four known species including a doubtful one (*C. Eberhardtii* Christ). The distribution of this genus is irregular. It is known from Sikkim, Annam, Philippine Islands and from New Caledonia, so this Malayan record fills in one of the many gaps.

C. tricuspis (Hooker) Christ, Journ. de Bot. 21: 273. 1908.

Before known only from Sikkim in the eastern Himalayas and, if one includes *C. Eberhardtii* as a form of this species, Annam. (*See* Copeland[4]). Found in Malaya at Fraser's Hill, West Pahang, close to the Selangor border in 1951, at altitudes between 3,600 feet and 4,100 feet (1191). These specimens collected by me agree with Hooker's original description under *Acrostichum tricuspis*[5], except that in the

Malayan specimens which I have examined, the mature fronds are uniformly longer. (The stipes in sterile fronds up to 59 cm. long, commonly 48 cm.; lamina length to 38 cm. Lateral lobes to 24 cm. long and nearly 8 cm. wide; intermediate lobes to 33 cm. long; however the width of the lamina is usually less than that stated by Hooker. I have been able to examine only two mature fertile fronds, both of which are also longer). Holttum in litt., draws attention to the round thin peltate scales on the lower surface of the sterile fronds which may be significant. Living fronds have a glaucous bloom on the lamina which is most characteristic, but this rubs off very easily and does not appear to be evident on dried material.

Bower[2] states that *C. tricuspis* is definitely terrestial, but Copeland[4] in his description of the genus calls them epiphytic or casually terrestial ferns; and a specimen from Indo-China in the Singapore Herbarium of *C. tricuspis,* no. 1157, is labelled: 'Epiphyte sous "le nid" de Drynaria coronans'. I am satisfied that at Fraser's Hill, this plant is most certainly an epiphyte, being terrestial only by accident. Bower also states that it is an upstanding species, but I have found that it is always pendulous, even when terrestial; in fact the long thin stipe would appear to be incapable of holding the lamina upright even in a small specimen.

I have not seen the type specimen nor any material from Sikkim, but Professor Holttum and Mr. Alston have kindly confirmed my identification. Eleven plant-masses of this fern were seen, only one of these being terrestial, and this was on a steep bank above a road in an open area. The plant was against the sawn-off bole of a tall forest tree which had evidently fallen from a ridge above, but was established on a rock in rich humus.

The other ten plants, each of which comprised a large plant-mass, were epiphytic and very uniform in their habitats. They were in tall forest on northern slopes of the high ridges and usually well away from streams. In each case the fern clump was growing at the base of a very large *Aglaomorpha heraclea* (Kze.) Copeland, which was perching high up on canopy trees, 50 to 80 feet from the ground. This being just below the forest ceiling, the Christiopteris received very little, if any, direct light. The bluish-green pendulous fronds are most distinctive and when fertile, their identity can be established easily with the aid of field glasses. During October many new fertile fronds appeared on the epiphytic plants, and when examined in January of this year, only the old withered remains were seen, no new fertile fronds appearing. On the terrestial plant, however, I have found only three fertile fronds in the nine months I have had it under observation.

C. tricuspis is probably quite common at Fraser's Hill, but difficult to find on account of the great height at which it perches. It is to be expected that it will be found in other places on the Main Range, at least where similar conditions exist, and perhaps may yet be found in Sumatra and Borneo where *Aglaomorpha heraclea* also occurs.

Coniogramme fraxinea (Don) Diels, Nat. Pfl. 1, 1/4: 262. 1899.

Hitherto known only from the Taiping Hills in Perak. I found this species at Fraser's Hill in March 1951, at 4,000 feet (1115). It does not appear to be abundant here as it is at Maxwell's Hill; only two localities having been found, both in tall forest on banks above streams. Dried material has a strong musky smell; some collected in Borneo in 1931 still retains it faintly.

Cyclosorus unitus (L.) Ching, Bull. Fan Mem. Inst. Bot. 8: 192. 1938.

Penang Hill, October 1951, about 2,000 feet (1526). In a dry grassy place. Semangkok Pass, Selangor/Pahang border; April 1952 at 2,700 feet (s.n.). On a grassy bank below the Gap Rest House, quite common. Previously recorded only from Singapore.

Drynaria rigidula (Sw.) Beddome, Ferns Br. Ind. t. 314. 1869.

Although this fern is widely spread in Malaya, it has not previously been collected in the State of Pahang. Here I found that it was quite common on rock and concrete walls which border the roads at Fraser's Hill, and on rotting wood on deserted dwellings. Although searched for, it was not found in the same habitat as in other states, namely as an epiphyte on old trees. (1080).

Dryopteris sparsa (Don) O. Kze. Rev. Gen. Pl. 2: 813. 1891.

Recorded previously from both Maxwell's Hill in Perak and from Cameron Highlands in Pahang, so it is not suprising that it has been found at Fraser's Hill. In April 1951, I found two small plants of this fern on a path on the north ridge at 4,000 feet (1324). They were both in open places in tall forest in loose soil. Only one was fertile. Although the adjacent area was searched then and later, no more plants were found until the following July, when many young plants were seen, again in loose soil along the sides of the recently cleared paths and covered drains on the same ridge. This year (1952) in April, these ferns were fertile and seemed well established; also on other ridges at Fraser's Hill about the same elevation some more small plants were found.

Microlepia puberula v.A.v.R., Bull. Jard. Bot. Buit. 2, xi: 17. 1913.

Hitherto collected three times in Malaya; once in Perak and twice in Pahang. I have found it on several occasions at Kepong Forest Reserve and at Sungei Buloh, Selangor (1382, 1482). It is never common and appears to favour loose soil especially on the jungle edges, where it is partially shaded, but I have also found it on steep ground in jungle where little direct light penetrates.

Pteridium esculentum (Forst.) Nakai, Bot. Mag. Tokyo, 39: 108. 1925.

A common fern of the lowlands which I have found at approximately 4,000 feet at Maxwell's Hill in Perak, in an exposed situation, on a grassy ridge (1777). It was locally common and did not appear to be stunted, most of it being about 150 cm. high. *P. aquilinum* (L.) Kuhn was also on this ridge but not very near the former species.

Pteris asperula J. Sm., (nom. nud.) Hieron., Hedwigia, 55: 302. 1914.

Although previously found in Selangor, it has been collected only three times in Malaya. I have found that this fern is not uncommon in forest clearings and on forest edges at both Sungei Buloh and Kepong Forest Reserve. It is usually in loose but moist soil, often tolerating much sun. At Sungei Buloh it is frequently cut back to ground level, where it grows on the edges of wide anti-malarial drains, but appears to survive this and even increases. (1400, 1681, 1890).

P. longipinnula Wall. (nom. nud.) Agardh, Recen. Gen. Pterid. 19. 1839.

This species has not been recorded from Selangor before. A plant was found at Klang Gates in 1951 (1690). It is smaller than the specimens in the Singapore Herbarium, but was growing on rock.

Pyrrosia stigmosa (Sw.) Ching, Bull. Chin. Soc. 1: 67. 1935.

Previously found only north of Pahang. It is not uncommon at Batu Caves in Selangor, but I found it only as an epiphyte here, on large Rain Trees, (*Enterolobium saman*) at the entrance to the limestone and granite quarry, in 1951 (s.n.). As these trees have been introduced into Malaya, it is possible that this fern will be found in this locality in the more usual habitat which is on limestone rocks.

Thelypteris beddomei (Baker) Ching, Bull. Fan Mem. Inst. Bot., 6: 308. 1936.

This species has not been previously recorded from Malaya, but has been found in other parts of Malaysia. I first collected this fern, which was identified by Professor Holttum, on the steep grassy slopes above Maxwell's Hill Post Office in 1949, at just over 3,700 feet (1205). It grows in large colonies here where the ground is moist, but well drained owing to the steepness of the banks. This area, no doubt an artificial one, must have been established for many years as this hill station is the oldest in Malaya. Beddome, p. 239[1], states that *T. beddomei* is common in swampy places, but specimens from Sumatra in the Singapore Herbarium which closely resemble the Malayan material, were collected in a 'rather open place'. The specimens from Maxwell's Hill appear to be normal compared with material in the herbarium, except that they are sparsely hairy on the costules and almost glabrous on the undersurface of the lamina.

T. brunnea (Wall.) Ching, Bull. Fan Mem. Inst. Bot., 6: 269. 1936.

Known previously from one collection from the Cameron Highlands district in Pahang. This year I found one plant at Fraser's Hill, just below 4,000 feet (2010). It was growing on mossy rocks on a covered drain in a clearing in light forest. This plant, however, differs from the Cameron Highland's specimen, which was identified as var. *glabrata* (Clarke) Ching, in that the undersurfaces of the fronds are quite glabrous. As this is the character on which Ching p. 25[3], separates the above form from var. *typica,* the Fraser's Hill specimen must be referred to the latter, if these varieties are maintained. There is, apart from the hairiness, much similarity between the two specimens. The fern would probably repay genetical investigation.

Psilotum triquetrum Sw. Syn. 117.

I found that this species occurs frequently at Fraser's Hill, between 3,900 and 4,000 feet, on trunks of large Cyathea sp., (usually *C. contaminans* [Hk.] Copel.) on forest edges and in forest where a great deal of light filters through, yet which is damp. It is worth noting perhaps that these plants are slender and lax, seldom having more than two stems to a plant. I saw it growing terrestially at the base of an introduced pine tree (Pinus sp.) on the roadside here. It was short and erect and was accompanied by *Ophioglossum pedunculosum* Desv., in short grass (1469).

In Singapore I have found it in the following places:—Near Reformatory Road; terrestial, in poor soil. Rare. May 1952. On a concrete gate-post in Tanglin Road; on top and sides, common (2071). On an island in the Sembilan group, south west of Singapore; terrestial, on the tops of dry hillocks, common; April 1949 (1248).

It is interesting to note that out of the seventeen ferns and allies listed above, eight have been found in artificial habitats of some sort and four which would appear also to have been aided by biotic factors. Some of these increases in distribution appear to have been established in their habitats in the localities recorded, for many years, such as *Athyrium japonicum* and *Thelypteris beddomei,* on Maxwell's Hill where both are locally abundant; whilst others would appear to be of recent origin as suggested by *Dryopteris sparsa* and *Thelypteris brunnea.* No doubt some have been overlooked by collectors, but at least at Fraser's Hill, where five species under discussion have been found, much field work has been done previously, especially on the contour paths where four of the five occurred. (*See* Burkill & Holttum, G.B.S.S., 3: 22. 1923.). Another indication of a recent arrival in a certain locality is given by Holttum[6], when recording the occurrence of *Cystopteris tenuisecta* (Bl.) Mett. in Malaya. He states that the plants were found growing abundantly on banks of a path through light forest and although he had visited this locality before the path was cut, no plants were seen.

It may be significant that eight of these twelve plants favour clearings in the forest or forest edge, often in loose soil. Some existed previously in isolated localities and perhaps were also to be found in temporary clearings, such as slips and Sakai gardens which would rapidly revert to forest. At the hill stations the paths and open grassy areas have been maintained, in some cases for many years thus giving these kinds of ferns a chance to fulfil their life cycles and to increase.

I wish to thank Professor Holttum for his valuable assistance and Mr. Henderson for permission to use the Singapore Herbarium and library. The numbers in brackets refer to my own collections, duplicates of which are in the Singapore Herbarium.

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